

## Columbia begins test of dynamic stability

### Tile installation on orbiter continues during software and design validation

The Shuttle spacecraft *Columbia*, in addition to installation of Thermal Protection System (TPS) "tiles" on its external structure, entered a two-week series of Dynamic Stability Tests (DST) Monday August 18, to verify the spaceship's lateral stability during certain "entry modes" on its return to landing.

The tests will validate design changes and the revision of flight control system "software" incorporated into *Columbia* for its first flight next March.

The design change was to move the flight control system's four rate gyros from the aft fuselage to the lower portion of the mid-fuselage. The revised "software" eliminates possibilities of the spacecraft encountering atmospheric flight conditions—pitch, attitude, and velocity—which might cause lateral instability.

Between the actual dynamic tests, in which the flight control surfaces are activated and the spacecraft's structure is subjected to "flexing," TPS technicians will continue proofload testing and application of low and high temperature insulation tiles, which is averaging 600 to 700 per week to meet the mid-November schedule requirements.

This week's testing is the

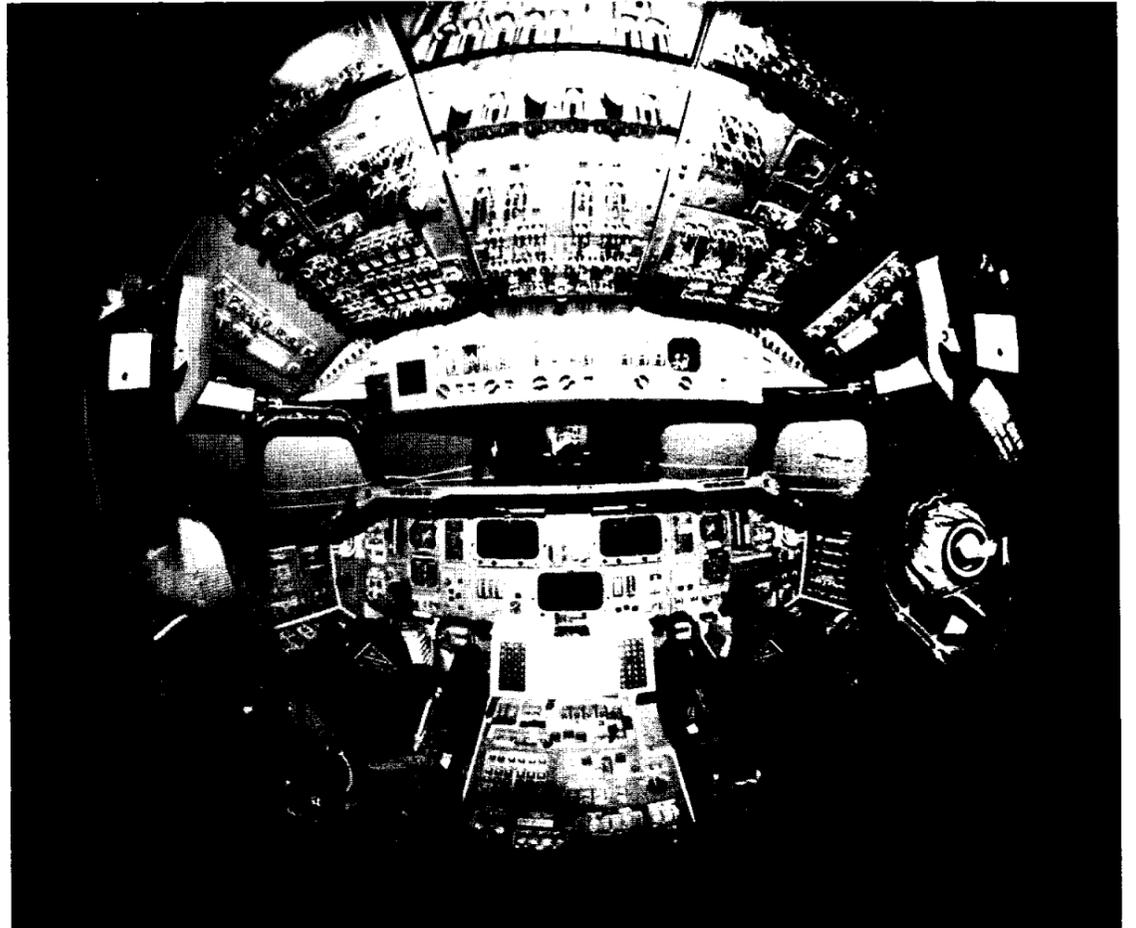
"closed loop" phase in which the flight control surfaces—elevons, rudder, speed brake—are hydraulically activated. The command signals are generated through the onboard computers from crew compartment controls or through the automatic control software. Rather than using the spacecraft's Auxiliary Power Units for the test, ground support equipment will power the hydraulic actuators.

For the dynamic testing, *Columbia* will be positioned on its nose gears and main landing gears with the tires partially deflated.

The second week of tests will be in the "open loop" phase in which ground support equipment activates the aerodynamic control surface movements.

The reinstallation of the four rate gyros in the mid-fuselage and the software revision was based on analytical review of a number of development tests conducted last year.

Two weeks ago the forward Reaction Control System was installed on *Columbia* and the present schedule calls for the Orbital Maneuvering System (OMS) pods to be removed the first week in September, modified, and reinstalled later that month.



Fish-eye lens view of orbiter *Columbia*'s flight deck at Cape

## JSC the top in safety

"It is the policy of the Johnson Space Center to provide a safe place of employment."

These words and aims in the opening paragraph of a JSC Safety manual are borne out by statistics that show JSC practices what it preaches, that JSC has the best safety record in government and industry.

Katherine Newkirk of the Safety Office Operations Branch feels there are several reasons for the excellent record at JSC. "JSC is one of NASA's newest facilities with more modern equipment. We have the largest operation safety staff of all NASA centers, and we receive enthusiastic support from JSC top management. NASA con-

tractors also follow a strict safety program.

Although JSC has the lowest number of on-the-job injuries of any NASA center, several hundred minor cuts, bruises, sprains, and strains have been reported to the JSC Clinic so far this year. "Most injuries can be treated with first aid, and only a few call for a person to be hospitalized or lose time from work," Newkirk said.

Most injuries are not caused by faulty equipment but rather by ignorance, carelessness, and preoccupation. "Injuries can be prevented if people would be a little more careful and slow down," Newkirk said.

She also recommends, "don't run on wet pavement, don't lift anything that is too heavy or bulky, wear protective garments when working with hazardous machines and chemicals, and avoid horseplay. If people would report any safety violations to their safety representative, corrective measures could be taken to eliminate hazards before injuries occur."

The Safety Office maintains a high level of safety at JSC by conducting scheduled safety inspections of all JSC buildings and facilities. From these inspections hazardous situations are reported to the division safety representative and to the safety office. The safety office then assures corrective measures are taken.

Periodic meetings and training sessions are held for safety representatives and employees. These sessions may include films, speakers, demonstrations, and questions and answer periods. They are designed to maintain a high level of safety awareness.

## WIF ready for crew training in fall

Almost everything about space travel — hard vacuum, temperature extremes, harsh sunlight — can be simulated on earth, except the slow-motion weightlessness of space. Brief half-minute periods of zero-gravity, or weightlessness, can be duplicated by flying a roller-coaster path in an airplane, but neutral-buoyancy in a water tank is the only way to approximate long periods of weightlessness.

JSC will begin using its new water immersion facility (WIF) in October for Space Shuttle crew training. Located in the round building which formerly housed the Apollo manned centrifuge, the half-million gallon tank is expected to be valuable in training Shuttle flight crews for space walks, or what space engineers call "extravehicular activity — EVA."

Measuring 33 feet wide, 78 feet long, and 25 feet deep, the new WIF holds as much water as 25 average backyard swimming pools. It replaces a circular tank 25 feet in diameter and 16 feet deep built in the mid-sixties for Gemini and Apollo emergency water egress training.

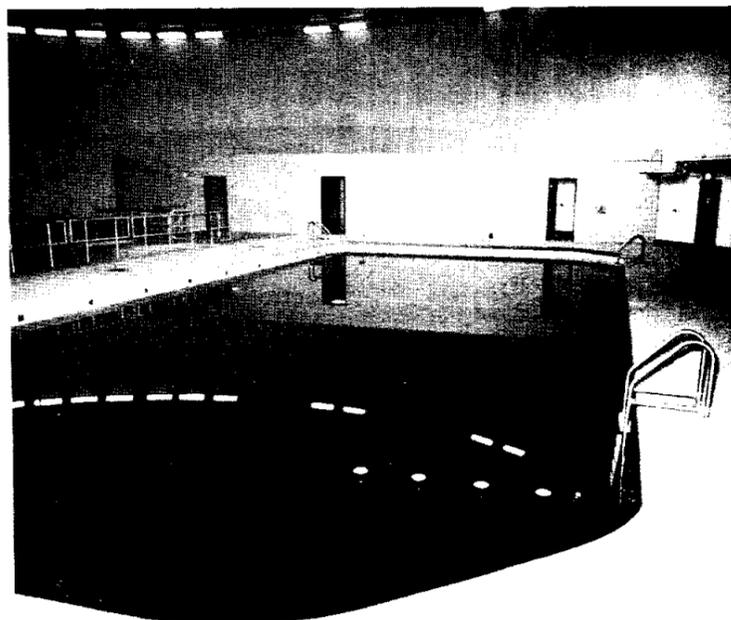
JSC and Marshall Space Flight



Center will provide WIF training mockups. Marshall will furnish some payload trainers while JSC builds others including a full-size Shuttle orbiter payload bay.

The WIF filtering and chemical systems reduce bacteria and provide clear water needed in underwater photography.

Six submersible TV cameras follow training operations — two



operated by divers and four mounted under water with pan, tilt, and zoom manipulated from a console at the pool's edge.

The water will be heated to a constant temperature of 85 degrees for safety divers' comfort over long periods of time.

An overhead crane will lift the mockups and trainers out of the water and place them on a huge

laydown area beside the pool. The air-powered five-ton crane eliminates electric shock hazard around the water.

The WIF has two air compressors to supply air to the astronauts during training and to fill scuba tanks.

Plans to construct an observation deck for visitors are also underway.

## Cookin'

### Week of August 25 - 29

**Monday:** French Onion Soup; Beef Chop Suey; Polish Sausage w/German Potato Salad; Breaded Veal Cutlet (Special); Okra & Tomatoes; Green Peas. Standard Daily Items: Roast Beef; Baked Ham; Fried Chicken; Fried Fish; Chopped Sirloin; Selection of Salads, Sandwiches & Pies.

**Tuesday:** Split Pea Soup; Shrimp Creole; Salisbury Steak; Fried Chicken (Special); Mixed Vegetables; Beets; Whipped Potatoes.

**Wednesday:** Seafood Gumbo; Fried Catfish w/Hush Puppies; Braised Beef Rib; BBQ Plate; Weiners & Beans; Shrimp Salad; Stuffed Bell Pepper (Special); Corn O'Brian; Rice; Italian Green Beans.

**Thursday:** Chicken Noodle Soup; Beef Stroganoff; Turkey & Dressing; BBQ Smoked Link (Special); Lima Beans; Buttered Squash; Spanish Rice.

**Friday:** Seafood Gumbo; Broiled Turbot; Liver w/Onions; Seafood Platter; Fried Shrimp; Meat Sauce & Spaghetti (Special); Green Beans; Buttered Broccoli; Whipped Potatoes.

### Week of September 1 - 5

**Monday:** Holiday

**Tuesday:** Celery Soup; Fried Shrimp; Turkey a la King; Pork Chop w/Applesauce; Chinese Pepper Steak (Special); Au Gratin Potatoes; Breaded Squash; Buttered Spinach.

**Wednesday:** Seafood Gumbo; Fried Catfish w/Hush Puppies; Braised Beef Ribs; Mexican Dinner (Special); Spanish Rice; Ranch Beans; Buttered Peas.

**Thursday:** Green Split Pea Soup; Corned Beef w/Cabbage & New Potatoes; Chicken & Dumplings; Tamales w/Chili; Hamburger Steak w/Onion Gravy (Special); Navy Beans; Buttered Cabbage; Green Beans.

**Friday:** Seafood Gumbo; Deviled Crabs; Broiled Halibut; Liver & Onions; BBQ Link (Special); Buttered Corn; Green Beans; New Potatoes.

## NASA craft make carrier landings

More than 500 landings on a simulated aircraft carrier deck have been successfully made by the NASA Quiet Short-Haul Research Aircraft in a U.S. Navy/NASA investigation of the application of propulsive lift technology to aircraft carriers.

The intensive six-week program included checkout of two Navy pilots in the aircraft; determination of the best method of landing a large aircraft like the quiet, short-haul model on an aircraft carrier; and repeated simulated carrier landings by the Navy pilots and NASA research pilots under various conditions to obtain statistical data on touchdown dispersion and sink rates.

The simulated landings were made at Crows Landing, a Naval Auxiliary Landing Field southeast of NASA's Ames Research Center, Mountain View, Calif.

A Fresnel lens, like those used aboard ship to guide pilots, was used for the tests, and an outline of an aircraft carrier deck was painted on the runway. With 37-kilometer-per-hour (23-mile-per-hour) headwinds the research aircraft achieved touchdown at about 84 km/hr (52 mph), a speed slow enough that arresting gear normally used on aircraft carriers is unnecessary.

It is planned that actual carrier operations of the aircraft will be demonstrated on a U.S. aircraft carrier at sea in waters off San Diego, Calif.

The high-performance short-takeoff-and-landing characteristic of the research aircraft is a result of the upper surface blowing propulsive-life technique used in its design. Four acoustically treated jet engines are mounted on top of the wing so that the fan air from the engines is directed across the upper surface of the wing and flaps to create very high levels of lift as compared to conventional wings.

The aircraft was built as a flight facility for research in terminal area operations at low noise levels at airports with short runways. At a design gross weight of 22,700 kilograms (50,000 pounds), it is a large aircraft with four turbofan engines but can operate at lower noise levels than most of today's small business jet airplanes.

## Bulletin Board

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Shuttle on the front, the Mission Control center emblem on the back. Cost for lettering depends on the number of letters. For further information contact Sandy Mangold at x3421 or Jerry Pfleeger at x2491. Orders must be placed by September 11.

### On Sale at the JSC Exchange Store

(Store hours 10 a.m. to 2 p.m.)

Dean Goss tickets: \$10 single,

\$20 couple (reg. \$14.50)

ABC Theatre tickets: \$2 ea.

General Cinema tickets: \$2.40 ea.

Astroworld tickets: \$8 each

Six Flags Over Texas discount

tickets

Magic Kingdom Cards: Free

Sea-Arama Marineworld Fun-

Time cards: Free

### Get Ahead in Life As A Toastmasters Member

Take that first step toward success. Come visit the Spaceland Toastmasters Club and see what Toastmasters can do for you. We meet every first and third Wednesday of each month at 11:30 a.m. at Franco's (Flying Pizza), 1101 NASA Rd. 1. For further information, call Steve Jacobs at x3561 or Emmit Fisher at x3278.

People who get ahead in life are usually those who can best get their ideas across to others. Wouldn't you like to develop this priceless skill? You can. Toastmasters can show you how to speak confidently, think on your feet, and listen effectively.

## NASA researches quieter airplanes

Living near an airport may not be as noisy an experience in the near future as it has been in the past, thanks to NASA aeronautical research.

NASA's Lewis Research Center, Cleveland, has completed testing in a program to adapt the technology of large turbofan engine design to smaller general aviation turbofan engines. The goal was to achieve significant noise and pollution reduction while cutting, or at least not increasing, fuel consumption.

The engines are called QCGAT for Quiet Clean General Aviation Turbofan. The new engines should

reduce perceived noise levels by 50% to 60%.

Tests with one engine showed noise reduction levels of about 10 decibels and another achieved reduction levels of some 14 decibels.

One way to illustrate aircraft noise level is by the size of the "footprint." This is the ground area below an aircraft's path that is subject to noise during takeoff or landing. The new engines reduce the size of this footprint to just one-tenth the size of the footprint for the quietest business jet currently in use.

The noise level reductions were achieved by slowing down the

velocity of the engine exhaust, and through proper acoustic design of the interior parts of the engine, including the addition of sound absorbing materials to quiet the noise produced by the engine fan, compressor, and turbine.

Reduced noise levels are not the only benefit promised for the new engines. One engine reduced carbon monoxide emissions by 54% and emissions of unburned hydrocarbons by 76%.

NASA engineers say that test results from both engines clearly demonstrate that noise need not be the major constraint on the future growth of turbofan-powered aircraft in general aviation.

## Satellite notes solar changes, could explain climate extremes

Using a new type of measuring device flown in space for the first time, a NASA satellite has detected small changes -- over periods of days to months -- in the brightness of the Sun.

Detection of even the slightest change in the amount of light and heat energy emitted by the Sun is important because if a trend were to continue for several years, it could produce major alterations in the Earth's climate. Measurement of such trends might enable scientists to predict future climate changes.

Fluctuations of about one-tenth of 1 percent have been seen several times by an experiment aboard the Solar Maximum Mission satellite. These fluctuations in solar radiation correspond to a change of up to 10 degrees Celsius (18 degrees Fahrenheit) in the Sun's average temperature of about 5,700 C (10,300 F).

The newly-measured changes in the Sun's output of energy may be related to sunspot or solar flare activity, according to meteorologist and physicist Dr. Richard C. Willson of the Jet Propulsion Laboratory, Pasadena, Calif., who developed the instrument to measure the Sun's radiance for the Earth-orbiting satellite.

The instrument, called an Active Cavity Radiometer Irradiance Monitor, one of seven experiments on the satellite, is capable of detecting changes in the Sun's release of energy as small as one thousandth of 1 percent. The in-

strument measures a very broad range (X-rays to radio waves) of the radiation that falls on top of Earth's upper atmosphere. This represents well over 99.9% of the total solar radiation reaching Earth.

Theoretically, an increase or decrease in the Sun's release of energy -- as little as 0.5% per century -- can produce profound changes in Earth's climate. It is estimated that a drop of only 1 percent in the Sun's output of radiation would decrease Earth's mean global temperature by more than 1 degree C (2 degrees F). The entire Earth would be covered with ice if the Sun's radiation decreased by only 6%.

The entire history of humankind, lived out in the last several million years, has occurred during abnormally cold times. There is evidence that the Earth has been growing colder for about 90 million years, and scientists believe the average global temperature may drop 10 or more degrees in the next several million years.

One-hundred-fifty million years ago, Earth was approximately 8 degrees C (15 degrees F) warmer than it is today. Since then, numerous warming and cooling climatic cycles have occurred. These cycles, which occur with frequencies ranging from 22 years to millions of years, have caused ice ages, ranging in severity from major glacial epochs to "little ice ages."

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Spectroheliogram of solar flare taken during Skylab 3 (1974)

## Goddard sets up solar flare 'hot line'

A "hotline" designed to inform the public of solar flares erupting on the Sun during this year's peak cycle of activity has been inaugurated at NASA's Goddard Space Flight Center in Greenbelt, Md.

The "Solar Max" hotline service is being provided jointly by NASA and the National Oceanic and Atmospheric Administration through the latter's Space Environment Services Center in Boulder, Colo. Information on sunspots, solar flares, geomagnetic storms and the impact of the Sun's behavior on radio transmissions will be provided in daily recorded messages from Goddard.

The telephone number is 301/344-8129.

Daily recordings will originate in the Solar Maximum Mission's Experiment Operations Facility. They will include reports on the locations of active regions on the Sun, as well as on experiments being conducted aboard NASA's Solar Maximum Mission spacecraft during the next 24-hour period.

Information provided by the recordings is expected to serve as a valuable source to astronomers, ground observers, amateur radio operators, geologists and other scientists interested in the Sun's activity.

The Solar Maximum Mission spacecraft is an orbiting solar observatory which was launched

from Cape Canaveral, Fla., last Feb. 14. The spacecraft, in a 575-kilometer (357-mile)-high equatorial orbit, circles the Earth every 96 minutes and carries seven instruments.

Through the coordination of observations from the instruments and from ground-based observatories throughout the world, scientists are conducting the most comprehensive investigation of solar flares ever made. Information from these sources is relayed to Goddard on an up-to-minute basis, 24 hours a day, seven days a week.

At Goddard, scientists review the data and determine what active regions of the Sun will be studied during the next 24 hours.

# Bulletin Board

## Come Hear the Houston Grand Opera

The Houston Grand Opera is offering corporate discount subscriptions to NASA employees and contractors. Obtain a special order form at the Building 11 souvenir shop. They will also be mailed with the summer catalog to Federal Business Association members. The form allows 20% off the regular subscription price or 50% off for senior citizens and students. Five operas will be presented in English in the Light Opera Series and six operas of the Grand Opera Series will be offered.

## This Theatre Offer Is Special for NASA Employees

The Nina Vance Alley Theatre Corporate Subscription Program is again being offered to NASA employees and contractors. Season tickets are available for next year's series of six performances at the low price of \$30 which may be charged on a variety of credit cards. Brochures and order forms are available at the Building 11 souvenir shop. They will also be mailed with the summer catalog to members of the

Federal Business Association. Corporate subscription coupon books will be home-mailed just prior to the opening of the '80-81 season in October.

## Help a Needy Woman And See the Astros Play

Everyone can help towards assisting with the educational scholarship funds of a needy woman returning to the business world by contacting (during lunch time) Elaine Stemerick at x3803, Pat Daniel at x4551, or Nancy Whitecotton at x4251. They are selling tickets for the September 10 game between the Astros and the Los Angeles Dodgers in a program sponsored by the Bay Area Chapter of the American Business Women's Association.

## Have Your Auto Emissions Checked

The Environmental Protection Agency is conducting an "Automobile Emissions Check" in Houston, August 1 through 30. The service is free and the findings will let the car owner know whether or not the vehicle is in need of a tune-up. The check is

being conducted at 4303 San Felipe (two blocks east of the Loop near the Galleria) Tuesdays through Saturdays. Stop by to have your vehicle checked. If you have any questions, contact Dee Schmetter at the Federal Executive Board office 226-4139.

## Join the JSC Bike Club For a Leisurely Ride

Join the JSC Bike Club for a leisurely ride around Galveston and Pt. Bolivar ending with lunch on the Strand. The ride begins at 9 a.m. Sunday August 24, from Sears parking lot, Galveston. Two club members will present a slide program on their bike tour of France at the September 8 meeting 5 p.m. Building 350 conference room. A 20 to 50 mile ride around Chocolate Bayou will be held Sunday September 7. For details call Brian Morris at x-5293.

## STS-1 Mugs Now Available

For \$5 for a 10 oz. cup or \$6.75 for a 16 oz. mug you can get a personalized beverage holder with full color insignia of the Space  
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... BY SENDING YOUR COST REDUCTION SUGGESTION ON A JSC FORM 1150 TO BE-3!

Cartoon by Russ Byther

## Variety of experiences offered at Gilruth Center

**Leisure Time Classes:** Registration is now being accepted for the following classes at the Gilruth Recreation Center.

**Ballroom Dance:** Learn all of the popular social dances for \$50 per couple. Class meets Wednesday evenings beginning September 10 for a 10-week course. Introductory and intermediate dancers will dance from 6:45 to 8:15 p.m. and high intermediate and advanced dancers will dance from 8:15 p.m. to 9:45.

**Country & Western Dance:** Learn all of the latest kicker dances as well as all the old standbys. Class meets on Monday evenings beginning September 15 for six weeks. Cost is \$18 per couple. Beginners dance from 7 p.m. to 8:15, and advanced from 8:30 p.m. to 9:45.

**Defensive Driving:** Learn the art of safe driving and qualify for a 10% reduction in auto insurance. Class meets Saturday September 27 8 a.m. to 5 p.m. Cost is \$15 per person.

**Basic Auto Mechanics:** This class is devoted to understanding the operation of an automobile engine, transmission, and brakes,

as well as performing preventive maintenance. Class will also include one lab. Cost per person is \$16.75. Deadline: September 15.

**Intermediate Auto Mechanics:** Designed as a follow on to the basic course or as a supplement to present basic skills, this course emphasizes performing minor tune-ups, carburetor overhauls, and light repairs (brakes, shock absorbers, hoses, belts). Class consists of four lectures and two labs. Students will actually perform minor tune-ups and/or install carburetor kits and overhaul brakes during the lab. Deadline for registration is October 20. Cost: \$33.50 per person.

Other upcoming classes to be looking forward to include: Scuba, disco dance, advanced beginner and intermediate tennis, and a photographic laboratory class in which you learn how to develop black and white, color, and special effects prints and slides

All classes have a minimum and a maximum number of students so be sure and register early. Registration is conducted in the gym office of the Rec Center.

## Bowlers look for members

The JSC Men's Bowling League will be opening its season shortly and invites both teams and individuals to come bowl with your friends and co-workers.

This competitive league uses the Peterson point system which not only matches team against team, but also individual against individual. The bowlers are ranked by handicap within their team and bowl against their opposite number for individual as well as team scores. This creates additional competition and makes bowling more challenging.

The league bowls on Thursday

nights at 6 p.m. at Fairlanes in Clear Lake City. The season will begin August 28 and will continue through May. The league is sanctioned by the ABC and prizes are paid for both team and individual achievements.

The JSC Men's League is looking for new teams this year (how about your division or company?) and can place individuals on existing teams. This is a good opportunity to have fun, keep in shape, and socialize with others from the Center. For information, call Bob Fletcher (x-4549) or T. Bruce (x-6134).

## SATO holds open house

The Scheduled Airlines Traffic Office (SATO) is inviting all NASA, contractor, and military personnel to an open house on August 27.

The SATO would like to demonstrate its newly acquired automated equipment to everyone who is interested. With this new equipment the office is now capable of instantly confirming reservations and immediate ticketing.

Each individual in the SATO office has received extensive training to operate this equipment.

This function will improve their efficiency as well as speed up ticket production.

The SATO handles personal as well as official travel arrangements, including tour packages. They are located in Bldg.1, Room 126.

So remember the date, August 27. Drop in for coffee and donuts and watch the operations or let them show you their equipment or just come in for a chat.

## Roundup Swap Shop

Ads must be under 20 words total per person, double spaced, and typed or printed. Deadline for submitting or cancelling ads is 5 p.m. the first Wednesday after publication. Send ads to AP3 Roundup, or deliver them to the Newsroom, Building 2 annex. No phone-in ads will be taken. Swap Shop is open to JSC federal and on-site contractor employees for non-commercial personal ads.

### Property & Rentals

**Sale:** 57.7 acres house needs repairs. Good fence. 1150 per acre. 8 mi. from Crockett, "Houston Country" 944-4972 after 5:30

**For Lease:** Baybrook area: Sterling Knoll subdivision, 2 story house, 1 yr old, 3 bedrooms, 2-1/2 bath, double garage: 488-2873 eve. & wknds.

**Galveston:** Ocean view condo. Completely furnished 2 bedrooms, pool, tennis. By week or day 944-3640 Denny

**Cottage on Gulf:** fishing at its finest this fall, \$25 day weekdays. Bolivar beach. Horton x5266.

**Lease:** League City, Newport. Energy efficient, 3-2-2 large family room, ceiling fan, fenced yard, draperies. \$485 mo. 488-6542.

**Lease/Option to buy:** beautiful home in Meadowbrook/Hobby, 4-2-2, has everything, 2250 sq. ft., 600/mo + deposit, x4504, 643-4859.

**Sale:** Alta Loma, 1973 14 x 70 mobile home 3 br 2 bath cent. A/H, appliances, unfurnished, new roof, \$6,800. 925-2533

**Lease/Sale:** 3-2-2 on quiet clu-de-sac, fenced, very nice, \$425/mo. plus deposit or assume 8-1/2% loan. Jeff 484-1514

**Rent:** Lake Livingston, Cape Royale, 3 br waterfront cottage by marina. Tennis, pool, golf, boat ramp, 3 day min. 488-3746

**Lease:** CLC Baywind, 1 br condo w/ all appliances incl washer/dryer, \$275/mo plus deposit. Gary McCollum x5031 or 488-2913

**Lease:** Sagemont, 4 br, 2-1/2 bath townhouse, 2 car garage, swimming pool, priv, wash/dryer. \$525/mo. Ed x5841 or 481-0679

**Rent:** Small 3 bedroom house w/refrigerator, Deer Park, close to schools, \$375/month. Donna x3473 or 476-4941

**Sale:** Golf, tennis, boating, fishing, country club lot at Highland Lakes Estates on Lake Travis, near Austin, Class A resort, reasonable. Steve x3561

**Sale:** Mobile Home in Baycliff. 14 x 70, 3 br., 2 b., central A/H. \$7500. 488-3265.

### Cars & Trucks

"Aggie Special" mobile home in college station. 12x65, in park. \$5000. call Bob Colvin x4235 or 645-8416.

76 AMC Gremlin a/c, fm/am, radio pls std trans w/od. clean \$2100. Jarvis 649-6471.

Starcraft tent trailer, starmaster 8 with stove, icebox, sink, sleeps 8, exc cond. 488-4915

1979 Buick Riviera, tan w/landau top, leather interior, loaded; call 486-5912 after 6.

1971 Mercedes, air, auto, am/fm stereo, 77,000 miles, exc. cond. \$5975. call 331-1230.

Volvo '75 -244- low miles on rebuilt engine, new paint, \$2800 or best offer. 474-3127.

75 Tioga Minimotor home, fully equipped, roof and dash air, assume CU loan, Scott x3278 or 554-6148

74 Porsche 914 2L, black, a/c, radio, good cond, \$4500 or offer. x6171 or 486-5875 eves/wkends

78 Diplomat, wire wheeled, chrome rack, air and power, AM/FM, 318 cu. with 33,000 miles. Equity \$325, assume 24 at \$163 (bank). Richard x6158

77 Granada Gia, 4 dr, V8 exc cond, \$2500. 486-5133 after 5

79 Olds 88 Diesel W/stereo, tape, A/C, PS/PB, 33,000 miles, \$5850. 469-2806 or 447-0217

78 Cougar XR7, exc cond, decor group, vinyl top, AM/FM cassette, A/C, tilt and cruise wheel, low miles, \$4800. x2205 or 334-4252 after 5

74 Galaxie, 4 dr, auto, PS/PB, air, fm/stereo tape, eq hitch, new tires, very good cond, \$1500. 946-1965

78 Ford Fiesta, A/C, tinted glass, Ziebart, sport equipment, 30 mpg, exc cond, \$4100. 728-0180

76 Chevrolet Vega, a/c, tinted glass, good mileage, exc cond, \$1800. 728-0180 after 6

74 Toyota Corona clean, good cond, \$2000. Tommy 481-4718

72 Chevy Impala Deluxe, fine shape, \$975. 332-1202 eves

74 Capri, 2800 V6, Capri red, AM/FM/stereo/tape, sharp, good mileage, \$1795. 474-2349 after 5

### Household Articles

9x12 rug, cream wool pile, like new x5277 or 486-5346.

Handcarved Spanish sofa \$175, coffee table \$75, Med triple dresser \$150. Cathy x2576

Baby bed with mattress, \$20. Bauch 333-3382

Desk and double dresser, White French Provincial, \$150. Tommy 481-4718

Mini-blinds, 9'x6', new, Bartlett green, easy installation, \$50. 946-4059

Red shag carpet, exc cond, 16 x 20 and smaller sizes, \$2/yard, x4271 or 482-6786

Large chrome boom lamp w/metal base, \$75. 945-3611

Wagon wheel light fixture, 3 lights, 20" diameter, \$25. E. Rubenstein x3116 or 334-2354

RCA 23-in. console color television, good cond, \$100. Sanders x3458 or 481-6928

### Miscellaneous

**Sale:** stamp collector wishes to sell his accumulation of sheets and plate blocks at 10% above face value: \$1000 plus. 482-5393 & weekends.

**Wanted:** 4 tickets to Oct 19 Oilers vs Tampa Bay. Jim Bates x 4601.

Crystal, 8 complete place settings, 140 pieces, type, Ingrid by Secna 334-2461

M29, 4-inch, new \$400. McB x6128 or 534-3076

Space Shuttle/Spacelab bronze belt buckles, \$8 each. Paperweights, \$9 each. Gary McCollum x5031 or 488-2913

Sears exercise bike, rowing action and adjustable height, exc cond, \$50. Steve x4061 or 480-3845

Used golf balls, like new, exc cond, have dozens, Palmer, Hogan, Titleist, Top-Flite, etc, 35¢ each, Smith x4468 or 488-3238 after 5

HP 97 programmable calculator, standard math and navigation programs. 331-0076

### Cycles

80 Suzuki GS550LT, under warranty, 2300 miles, 53 mpg, dark blue, step seat, pull-back handlebars, six-speed transmission, \$2400 or \$400 and assume loan, Snyder x5384 or 488-1705 after 5

75 Yamaha RD 350 motorcycle, 7800 miles, good cond, \$450. Lynn 480-1689 after 5

### Pets

Female Cockatiel with cage, \$50. Barbara 337-3683 after 6

### Lost & Found

**Lost:** Two pair roller skates in parking lot B-5 across from Bldg. 45 on 8/7/80. One men's and one women's with yellow wheels, Reward \$75. Claudia x4481

### Stereos & Cameras

Kenwood KT-8100 75 W/ch. amplifier, Yamaha CT-400 FM/AM tuner, Cannon 1020 speakers, all xint, \$400. 488-3966

Garrard 40-B turntable, Lafayette amplifiers, Criterion 222 speakers. Very good cond, \$65 total. x5221 or 334-1448 night/weekends

Realistic Set 11 stereo cassette tape deck, full-feature front load w/Dolby noise reducer. Complete w/owner's manual, \$125. 945-3611

2 meter tempo VHF/one plus 144-148Mhz, 25 watt transceiver, remote tuning, like new, in box, \$250. Chuck 487-2978

Kenwood 25 watt AM/FM stereo receiver, 6 months old, going to college must sell. Wade x3912 or 986-5481

### Musical Instruments

Alto sax exc cond, \$350 or best offer x7251 or 482-0013 after 6

Yamaha acoustic guitar, very good cond, \$250. 941-6218

Guitar, Banjo, Mandolin, Bass players wanted to form Bluegrass band call Don x2555 or 487-1321 after 5

Yamaha silver flute with case, exc cond, used 2 years, Suitable for beginner or intermediate student, \$12. Avis x3205 or 474-5601 after 5:30

# He set a goal and met a challenge

By day U.S. Air Force Captain Jack Spiker (Major Selectee) is a spacecraft integration engineer at JSC. His job is to translate the latest space shuttle cargo bay requirements into Air Force terminology to ensure that USAF payloads will be compatible with the Shuttle.

But by night and on most weekends, Spiker transforms into a master craftsman: an organ builder.

Spiker's latest venture into this double life began four years ago when he was assigned to JSC. He began attending the St. Barnabus Episcopal Church in Houston about the time the church's pipe organ began suffering another in a series of major malfunctions.

Coming to the rescue, Spiker loaned the church his own small portable pipe organ, and he offered to construct a new church organ. The deal

was struck -- St. Barnabus would buy the parts and Spiker would provide the labor --and Spiker began a project which few people would even contemplate much less attempt.

Spiker has done this type of thing before. He has built two organs, a clavichord, and a harpsichord. Spiker majored in physics in both undergraduate and graduate school, and he

says that physics and music have a natural interrelationship.

It was his fascination with the scientific principles of an electronic organ that first drew him to music.

Spiker also believes that his training as a Systems Command engineer has aided immeasurably in his work as an organ builder, as he is able to

visualize such endeavors from a "systems" perspective.

He likens the construction of a pipe organ to the acquisition of any basic Air Force project. There was a Required Operational Capability: construct a 538-pipe organ in 24 months and install it in the St. Barnabus Church. There was a budget: \$23,500. There was a prime contractor: Jack Spiker, Inc., and of course there were very exacting specifications -- the organ was styled after the North German Baroque Organs with two manual pedals, a slider windchest, mechanical keys, and stop action.

Once he began, Spiker suffered many of the problems common in today's procurement world. Inflation drove the cost up nearly \$2000. The schedule slipped 18 months. Some vendors were recalcitrant, such as the West German organ pipe manufacturer who refused to ship any



material until 12 months after he received payment. And Spiker's factory needed some capital improvements before the task was complete -- he had to saw many of the rafters out of his garage roof in order to complete the pipe installation.

Thanks to Spiker's dedication, hard work, and skill, the organ had its "rollout" on June 28 and is in place at St. Barnabus' giving listening pleasure to the church's hundreds of parishioners.



## Communications

### NASA sees boom in satellite demand

Television programs directed to patients in individual hospital rooms to explain the nature of the illness and how to cope with it; hospitals tied into a satellite-cable television hookup that presents the latest in information and techniques to medical personnel; long-distance conferences and meetings via picture phone; the almost instant delivery of mail; the movement of funds from bank to bank; the rapid transfer of computer data and company records; and the speedy exchange of large amounts of printed material and graphics are just a few of the changes being wrought in our daily lives by the communications satellite.

The nationwide requirement for telecommunication services is expected to grow fivefold by the turn of the century, according to recent studies conducted for NASA.

By the year 2000, as much as one-fourth of all long-distance voice traffic may be carried by satellites, as well as one-half of all data and video traffic.

One reason for the surge in demand is that satellites offer a number of advantages over other systems because they are capable of handling huge amounts of data.

"There is a finite amount of orbit space and the demand is considerable," according to George Knouse of Headquarters. "Communications demands are growing to the point where we expect two dozen more communications satellites to go up within two or three years."

This rapidly growing need for communications satellites could create problems primarily due to the limited number of radio frequencies available to space satellites. Research is currently

concentrating on opening the 20/30 gigahertz (GHz) frequency band for commercial use during the next 20 years in a cost-effective and spectrum-conserving manner. To date, the band has not been used in this country.

The NASA-funded studies indicate that by the early 1990's the growing demand for long-distance telecommunications services will saturate the nation's existing domestic satellite capacity in the bandwidths at 4-6 GHz (C-band) and 11-14 GHz (Ku-band). To accommodate the expected rapid requirements, more versatile satellites that have higher capacity and operate in the 20/30 GHz band, as well as in currently used bands, will be needed.

A major attraction of the 20/30 GHz band, called Ka-band, is the broad frequency range allocated to communications satellite use -- five times the band allocated at C-band or Ku-band.

Using the Ka-band, advanced

technology satellite systems would have message capacities of 50 to 100 times those operating in the C-band.

The studies conducted by the U.S. Telephone and Telegraph Corp., New York, N.Y., and by Western Union Corp., Upper Saddle River, N.J., concluded that most data services traffic will begin and end at terminals served by computers, with executive videoconferencing expected to become a partial substitute for business travel by the year 2000. By that time, 90% of all telecommunications traffic will require realtime or instantaneous service. The remaining 10%, such as electronic mail delivery, will be non-realtime needs.

The studies were done in conjunction with NASA's recently announced decision to initiate a five-year development effort aimed at retaining U.S. world leadership in satellite communications research and technology.

NASA has assigned lead responsibility for the program to its Lewis Research Center in Cleveland.

Advanced technical studies, underway already at Lewis, are focusing on the feasibility of high-technology satellites employing multi-beam antennas, on-board signal processing and switching, high-power transmitters using both solid state and traveling wave tube amplifiers, and solid state low-noise amplifiers.

Lewis communications specialists hope the studies will lead to the development of a space communications system capable of pinpointing transmissions almost anywhere in the country regardless of population size or electronic sophistication.

### Dog visits space center

Bill Simon (EP5) wishes to thank Security employees in Building 100, "particularly Mr. T. W. Moore," for caring for his black Labrador retriever, Buck, who recently left home without permission.

"He wandered on site, attempting to take part in the Visitors' Program," Simon says. A Security guard escorted the dog

to Building 100 where he was entertained and treated to dog biscuits.

"After a pleasant visit with Security employees, Buck was taken home and boarded by Mr. Moore while I was on vacation," says Simon. "So, to all of you kind folks in Building 100, THANK YOU. I'm happy to have him back."

### Solar Changes

From page 2

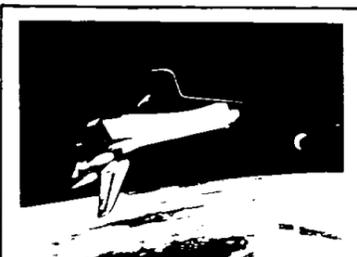
The last "little ice age," which began in the mid-17th century and lasted through the mid-19th century, was marked by a one-and-a-half degree drop from the present mean global temperature of about 14 degrees C (58 degrees F). This slight change in the Earth's average temperature resulted in an observable increase of glaciation in the Alps.

The Solar Maximum Mission satellite, launched into a 575-kilometer (357-mile) orbit above Earth last Feb. 14, is managed for

NASA's Office of Space Science by the Goddard Space Flight Center, Greenbelt, Md.

The spacecraft's observations are part of NASA's solar monitoring program, now focused on studying the Sun during the Solar Maximum Year -- a 19-month period when sunspot activity, which rises and falls in an 11-year cycle, is at a peak, additional flights of a similar device, again supplied by Dr. Willson, will occur as part of NASA's Spacelab program. The latter will be carried into space aboard the Space Shuttle.

Roundup deadline is the first Wednesday after publication.



The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for all space center employees.

Editor..... Kay Ebeling



**15 YEARS AGO—With the Gemini 5 mission completed, three flight directors light up a victory cigar. They just learned that astronauts L. Gordon Cooper, Jr., and Charles Conrad had been recovered in the western Atlantic to successfully conclude the eight-day spaceflight. Left to right are Christopher C. Kraft, Jr., John D. Hodge, and Eugene Kranz.**